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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,147	12/15/2000	Yasuo Kobayashi	200669US0DIV	9061

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EXAMINER	
HASSANZADEH, PARVIZ	

ART UNIT	PAPER NUMBER
1763	16

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/736,147	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	Parviz Hassanzadeh	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *32-36 and 38-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *32-36 and 38-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/086,574 and 09/437,500* .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

DETAILED ACTION

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 32-36, 38, 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al (US Patent No. 5,328,558) in view of Heimanson et la (US Patent No. 5,775,416).

Kawamura et al teaches a surface treatment apparatus (Fig. 1) comprising:

a remote plasma source including a pipe 32, microwave guide 48 and gas supply source 44, 46 (*a plasma generation section for generating plasma from a plasma generating gas*);

a vacuum chamber 10 disposed therein a susceptro12 supporting a semiconductor wafer 14(*a treatment vessel connected to the plasma generation section and including a susceptor on which a subject to be treated is placed*);

a coolant medium supply device 18 for supplying coolant through a passage 12 formed in the susceptor 12 (*a cooling device for cooling the subject placed on the susceptor to a predetermined temperature*);

a buffer chamber 30 for mixing a gas provided from a gas source 54 via a pipe 34 and the remotely activated plasma gas from pipe 32 (*a supply section for adding a reactive gas to an activated plasma generating gas activated by the plasma generation section and caused to flow toward the subject cooled by the cooling device, wherein the activated reactive gas is generated by adding the reactive gas to the activated plasma generating gas, and the activated reactive gas is reacted with a surface layer of the subject cooled by the cooling device*).

Kawamura et al fails to teach a heating device for heating the susceptor (*a heating device for heating a product produced by a reaction between the activated reactive gas and the surface layer of the subject, wherein the product is removed from the subject by heating the product by the heating device*).

Heimanson et al teaches a temperature controlled chuck 20 (Fig. 1) including a heating unit 24 and cooling unit 34 which separated from each other by a cavity 50. the heating unit 24 including a heating element 28 for heating the wafer up to 1000°C (abstract and column 3, lines 20-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the heating mechanism as taught by Heimanson et al in the apparatus of Kawamura et al in order to heat the wafer to a desire temperature.

Further regarding claims 32, 33 (intended used of the heating device): The intended used of the heating unit is considered a process limitation and the apparatus disclosed by the above recited prior art is inherently capable of being used for heating the wafer in order to remove products produced by a reaction between the activated reactive gas and the surface of the wafer. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley,* 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.,* 15USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed dos not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham,* 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114.

Further regarding claims 34-36: the cooling device of Kawamura et al is capable of cooling the substrate below 0°C (column 4, lines 35-36).

Further regarding claim 38: the heating unit of Heimanson et al is capable of heating the wafer sup to cooling1000°C (column 3, lines 20-30).

Further regarding claim 42: Kawamura further teaches a gas exhaust hole 60 disposed on a side wall of the chamber as shown in Fig. 1.

Further regarding claim 43: Kawamura further teaches the buffer chamber 30 having a porous plate 28 attached to the lower surface of the buffer chamber 30.

Further regarding claim 44: in view of Fig. 1, it would have been obvious for the gas supply section 30 of Kawamura et al to be at least 20 cm away from the end of the plasma generation section as a matter of optimizing for the best result.

Claims 39-41, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al (US Patent No. 5,328,558) in view of Heimanson et la (US Patent No. 5,775,416) as applied to claims 32-36, 38, 42-44 above, and further in view of Lee (US Patent No. 5,616,208).

Kawamura et al in view of Heimanson et al teaches all limitations of the claims as discussed above except for the heating device being a heat radiation device (lamp) provided above the wafer.

Lee teaches a wafer processing system wherein a heating halogen lamp 31 is arranged under a susceptor 28 for heating a wafer 8 as shown in Fig. 3 (column 12, lines 1-12) or a heating unit 53 is arranged above an upper surface of a chamber 51 for heating a wafer 52 as shown in Fig. 4 (column 13, lines 5-22 and 36-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the heating mechanism as taught by Lee in the apparatus of Kawamura et al in view of Heimanson et al in order to heat the wafer from above the surface of the wafer.

Lee further teaches lifting pins for lifting the wafer during heating (column 13, lines 45-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the lifting mechanism as taught by Lee in the apparatus of Kawamura et al in view of Heimanson et al in order to lift the wafer during heating.

Le further teaches a cluster tool apparatus having a plurality of treatment chambers for performing different treatments such as cleaning, etching and deposition (column 2, lines 28-65; column 14, lines 33-34).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the apparatus of Kawamura et al in view of Heimanson et al into a cluster tool as taught by Lee in order to perform a series of different processes on a wafer efficiently and continuously.

Claims 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al (US Patent No. 5,328,558) in view of Heimanson et la (US Patent No. 5,775,416) as applied to claims 32-36, 38, 42-44 above, and further in view of Kikuchi et al (US Patent No. 5,919,336).

Kawamura et al in view of Heimanson et al teaches all limitations of the claims as discussed above except for the reactive gas contains a fluorine-containing gas (NF_3).

Kikuchi et al teaches a remote plasma source (Fig. 1) wherein the reactive gas is NF_3 and is added to a downstream plasma produced from gas containing hydrogen.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the NF_3 downstream of the plasma in a method of removing an oxide from a surface. Further including a nitrogen gas as a plasma generating gas is considered an obvious substitute for the same purpose of generating a plasma or as a commonly known diluent gas.

Further regarding type of gas: The particular type of gas used is a process limitation rather than an apparatus limitation, and the recitation of a particular type of gas does not limit an apparatus claim, see *In re Casey,* 152 USPQ 235; *In re Rishoi,* 94 USPQ 71; *In re Young,* 25 USPQ 69; *In re Dulberg,* 129 USPQ 348; *Ex parte Thibault,* 64 USPQ 666; and *Ex parte Masham,* 2 USPQ2d 1647. This rejection is based on the fact the apparatus structure taught by the above recited references has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on the inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

P. Hassanzadeh

Parviz Hassanzadeh
Examiner
Art Unit 1763

May 29, 2003